Fiscal multipliers in Emerging Market Economies: can we learn something from Advanced Economies?

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Abstract

This paper empirically analyses the relationship between public spending and GDP in a panel of Emerging (EMEs) and Advanced Economies (AEs) from 1990 to 2013. Using a Panel VAR model and an Interactive Panel VAR model, spending multipliers in AEs and EMEs are computed and previous results in the literature are confirmed: EMEs have smaller spending multipliers than AEs, and the persistence is weak in both cases. Then a Panel Conditionally Homogenous VAR model (Georgiadis, 2012) is used to analyse how the development degree modifies the role of main determinants of fiscal multipliers. This method allows the relationship between GDP and public spending varying across countries according to one or two conditioning variables. First of all, we find that traditional determinants (imports, public debt, unemployment, savings, financial development) act in the same way in EMEs and AEs. Secondly, in relative terms and considering the weakness of fiscal multipliers in EMEs, public spending efficiency is more sensitive to the considered determinants in EMEs than in AEs. Thirdly, each tested determinant is individually insufficient to reach the same efficiency of public spending in EMEs than in AEs. Thus the conclusions about AEs cannot be fully extended to EMEs, governments have to act on other factors to improve their fiscal policy efficiency.

JEL Classificaion: E62, H5, O23
Key Words: Fiscal Multiplier, Spending Multiplier, PCH-VAR, Emerging Markets

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1 Introduction

Literature about fiscal multiplier regained interest from the recent financial and economic crisis: the worldwide increase of public spending brought up to date the debate about the effectiveness of Keynesian mechanisms.

Theoretically, the fiscal multiplier is a well-known Keynesian concept whereby an increase in public spending will generate a more than proportional increase in GDP. When a government increases its spending, global demand rises and, as a response, supply rises too. In order to increase the level of production, firms need to employ more workers, hence they pay more wages. With their (new) wages, workers will consume, thus increasing again global demand. This mechanism will be repeated, ad infinitum, but the demand rise will be steadily decreased.

Nevertheless, and still from a theoretical point of view, there is no consensus that fiscal expansion causes growth expansion. According to (neo)classical economists, an increase in public spending will crowd out private consumption and investment, especially by a rise of the interest rate or because of the Ricardian equivalency principle. Thus, fiscal expansion has no effect on GDP or even a negative one.

Empirically, results reflect the theoretical debate: fiscal multipliers range from close to zero to more than 2 (IMF, 2012). Such a difference seems to be due to the methodology used and the countries considered. Thus, there is neither theoretical nor empirical consensus about the size of fiscal multiplier and the way to measure it, despite the proliferation of analysis from the onset of the crisis.

Most of the empirical studies about fiscal multipliers are interested in Advanced Economies (AEs), and very few studies address this issue in Emerging Market Economies (EMEs). Analysing the fiscal multiplier in EMEs is however a relevant subject regarding the necessity of boosting development and the weakness of financial resources of governments. The few studies about multipliers in EMEs find that fiscal multipliers are smaller in these countries (Ilzetzki et al., 2013; Kraay, 2012). This difference is theoretically explained by a lesser supply-side flexibility in EMEs, a faster growth over the last decades, and a weaker management in public spending; but there is no empirical explanation about this. Indeed, the same determinants of the fiscal multiplier are considered in EMEs and in AEs (Ilzetzki et al., 2013). However, the particularities of EMEs ask for a specific analysis of the multiplier mechanisms (Combes and Mustea, 2014), and make the fiscal policy transmission channels different (Baldacci et al., 2003). So can we really extent the conclusions about fiscal multipliers determinants in AEs to the EMEs case?

The contribution of this paper is twofold. First, we test the existence of the traditional determinants of fiscal multipliers in EMEs. Second, we check that the level of development can modify the extent in which these determinants act using a PCH-VAR model (Georgiadis, 2012).

Thus, we confirm that fiscal multipliers are smaller in EMEs than in AEs, but determinants such as public debt, trade openness, unemployment, saving rate and credit-to-GDP act in the same

direction in EMEs and AEs. Moreover, taking into account the weakness of their values, fiscal multipliers in EMEs are more sensitive to an improvement of the determinants considered. However, none of these factors allow public spending to become as efficient as public spending in AEs.

This paper proceeds as follow: section two presents the main empirical methods to estimate fiscal multipliers; section three estimates fiscal multipliers both in EMEs and AEs using two methodologies; section four discusses the theoretical reasons for differentiating the effects of macroeconomic factors between EMEs and AEs; section five presents an empirical analysis of the determinants of fiscal multipliers in EMEs and AEs; section 6 concludes.

2 How to empirically measure multiplier effects?

Measuring fiscal multiplier applies for identifying exogenous shocks in public spending. Indeed, estimating the impact of public spending on GDP leads to an issue of reversal causality: government spending could affect GDP, but GDP could also affect government spending.To deal with this identification problem, two main empirical approaches are currently used in the literature[1]: the narrative approach and the Structural Vector Autoregressive approach (SVAR).

First, with the narrative approach, or "natural experiment" (Ramey and Shapiro, 1998), we can identify exogenous variation in public spending by using military spending. The theoretical argument behind this is that "significant changes in overall government spending are directed to a few subcategories of spending", and military spending variations could be considered as exogenous to the economic context. The authors study the case of United States and affirm that government spending on durable goods increased in time of military build-ups. As all wars in which the USA have recently been involved have not been on the US territory, these did not affect local infrastructures, and hence an increase in public spending on durable goods is not due to the economic context. In this way, many economists use military spending to identify exogenous changes in public spending[2], but they only are interested in the US case. If fact, this narrative approach cannot be applied to any countries because of two main factors:

- Government spending can be due to the war itself: countries can experiment war on their territory, so an increase in public spending is necessary to rebuild and repair damages, making the observed variation in public spending endogenous;
- War can be due to economic conditions and not only driven by exogenous political factor, especially in developing countries; this also makes government spending endogenous to prevailing macroeconomic factors.

[1]Note that marginal methodologies exist; they mainly try to use some macroeconomic variables to identify fiscal shocks. Clemens and Miran (2011) use fiscal rules, Kraay (2012) uses lending from official creditors, Estevão and Samake (2013) use a Structural Vector Error-Correction Model (SVECM) and use annual data.

[2]see for example Ramey and Shapiro (1998); Edelberg et al. (1999); Eichenbaum and Fisher (2005); Ramey (2011); Barro and Redlick (2011); Fisher and Peters (2010); Nakamura and Steinsson (2014).

These limits make this identification strategy invalidated in many countries; the narrative approach cannot be applied. Thus, a second method was developed by Blanchard and Perotti (2002) who employed a Structural Vector Autoregressive (SVAR) model. Using VAR models, dynamic relationships between variables can be represented, and the Structural form enables the identification of (structural) shocks. Indeed, with theoretical assumptions, this approach permits to identify fiscal shocks considering the structural form of SVAR's residuals. Blanchard and Perotti (2002) suppose that public spending does not respond to economic context in the same quarter. Thus, the discretionary (exogenous) part of fiscal policy can be isolated by using quarterly data if we order the effect of current GDP on current spending is zero. Indeed, an increase in public spending can be due to three events:

- An automatic and immediate response to GDP and macroeconomics variations, commonly named "automatic stabilizers";
- A discretionary change in fiscal policy in response to the economic context;
- An exogenous change in public spending without relation with the economic context. We are interested in the last case.

We control for the effects of automatic stabilizers by assuming that current GDP has no effect on current spending. Even if automatic stabilizers act immediately, we consider that its effects on public spending are very small so the assumption remains realistic.

Regarding discretionary changes in public spending according to the economic context, if we consider public spending cannot be changed further to a GDP shock in only one quarter, we artificially supress discretionary endogenous change in fiscal policy by the structural assumption of Blanchard and Perotti (2002) . Actually, by assuming that GDP has no contemporary effect on public spending, we assure the only source of public spending variations is exogenous. Thus, we artificially remove automatic response of public spending to GDP, and we isolate exogenous fiscal shocks. To do this, quarterly data are needed because using annual data would imply that a government does not change its fiscal policy during an entire year, which is not true.

This paper uses the Blanchard and Perotti (2002) assumptions in order to estimate multiplier effect in EMEs and AEs. However, panel methodologies are more suitable for an analysis of many countries. Thus, we use a Panel Vector Autoregressive (PVAR) model that allows us to take into account both the cross-country and the time dimensions.

3 Estimating multiplier effects in EMEs and AEs

In this section, we estimate fiscal multipliers in AEs and EMEs using two methodologies: a Panel VAR (PVAR) model, and an alternative specification of PVAR with interaction terms (IP-VAR).

3.1 Methodology

Following Blanchard and Perotti (2002), we estimate a PVAR model which is described below:

$$X_{n,t} = A(L)X_{n,t-1} + a_n + \varepsilon_{n,t} \tag{1}$$

where

- t denotes time and n denotes country;
- $X_{n,t} \equiv [G_{n,t}, Y_{n,t}]$, with G the growth rate of quarterly government spending (consumption) and Y the quarterly growth rate of GDP, both in real terms;
- A is a matrix polynomial with L lags;
- a_n is a vector of country fixed effects which allows to take individual heterogeneity into account;
- $\varepsilon_{(n,t)}$ is a vector of errors terms that can be interpreted as i.i.d. shocks to government spending and GDP growth under its structural form.

Note that we only introduce G and Y in the VAR specification with the aim of limiting restrictions and maximize the number of observations. We also performed PVAR estimations with three additional variables, as in Ilzetzki et al. (2013) (current account of the trade balance, real effective exchange rate and monetary policy interest rate), and results are not presented because no significant difference was found.

We use quarterly data in order to isolate the discretionary part of fiscal policy, and we order the variables in the PVAR following Blanchard and Perotti's hypothesis. It consists in a Cholesky decomposition which supposes the first variable (public spending) is "more exogenous" than the second (GDP).

This first estimate gives us some Impulse Response Functions (IRFs) that present the reaction of GDP after a one standard deviation (exogenous) increase of public spending. To compare several cases, we have to consider the same size of spending shocks and, following previous definitions of fiscal multipliers, we need to calculate the value of the fiscal multiplier using IRFs coefficients. As a consequence, the impact fiscal multiplier at time t=T is computed as follow:

$$k_t = \frac{\Delta Y(t=T)}{\Delta G(t=T)} = \frac{y_T}{g_T}\frac{\text{irf}_{t=T}}{\sigma_G} = \frac{\text{irf}_{t=T}}{b.\sigma_G} \tag{2}$$

where

- y_T is the GDP at time T;
- g_T is the government spending at time T;
- $\text{irf}_{t=T}$ is the impulse response function of GDP to a public spending shock at time T;
- σ_G is the initial shock of public spending;
- $b = g_T/y_T$ is the public spending on GDP ratio.

3.2 The data

We build an unbalanced panel data set composed by 48 EMEs and AEs over the period 1990-2013. The list of countries is shown in appendix, table 3, and table 4 presents the data sources. All the endogenous variables in the PVAR are collected at a quarterly frequency, and the main descriptive statistics are presented in appendix, table 5.

Before running the estimation, we first use an X-11 process to remove and correct data seasonality.

We use the growth rate of each variable. All the variables are graphed for each country, and to confirm the visible stationarity of the variables we implement panel unit root tests. The test from Im et al. (2003) and the Fisher test set by Choi (2001) are presented in appendix, table 6. Note that EMEs and AEs are differentiated by using the World Bank Classification based on Gross National Income (GNI). All countries that are not in high income category are considered as EMEs [3].

3.3 Results

Before estimating PVAR, we choose the optimal lag length that we have to consider. To do so, we use the Moment Model Selection Criteria (MMSC) developed by Andrews and Lu (2001): we compute MMSC-BIC, MMSC-AIC and MMSC-QIC for one to six lags. We must choose the model which minimizes the criterion. Table 7 in appendix presents the MMSC-AIC [4] for AEs and EMEs. For the both sub-samples, the optimal lag is one lag, so we use one lag for all PVAR estimations.

We estimate PVAR model first for AEs and then for EMEs. In both cases, we test the PVAR stability by checking the eigenvalue condition. Graphs presenting eigenvalues are available in an additional annexe.

Figure 1 shows the Impulse Response Functions (IRF) of real GDP growth to a one standard deviation shock in public spending in AEs and in EMEs. Each IRF is computed with a 90% confidence band based on Monte Carlo simulations (2000).

With the IRFs coefficients, we can compute fiscal multipliers for both types of countries. We find a smaller multiplier in EMEs (0.46) than in AEs (1.3). In EMEs, the effect disappears from the first quarter after the shock, but in AEs, the effect continues one quarter after. Globally, and cumulatively, the effect remains positive. (see appendix, table 12, for cumulative IRFs). To confirm these results, a PVAR with an interaction term (IP-VAR) is estimated. This method has been implemented by Saborowski and Weber (2013) and allows the relation between the endogenous variables in the PVAR to vary according to the interaction term value. As interaction variable, we use a dummy variable which takes the value 1 if the country is an AE, 0 otherwise.

The model is given by:

[3] Countries can change category over the period.

[4] MMSC-BIC, MMSC-AIS and MMSC-QIC are equal when the system is just identified.

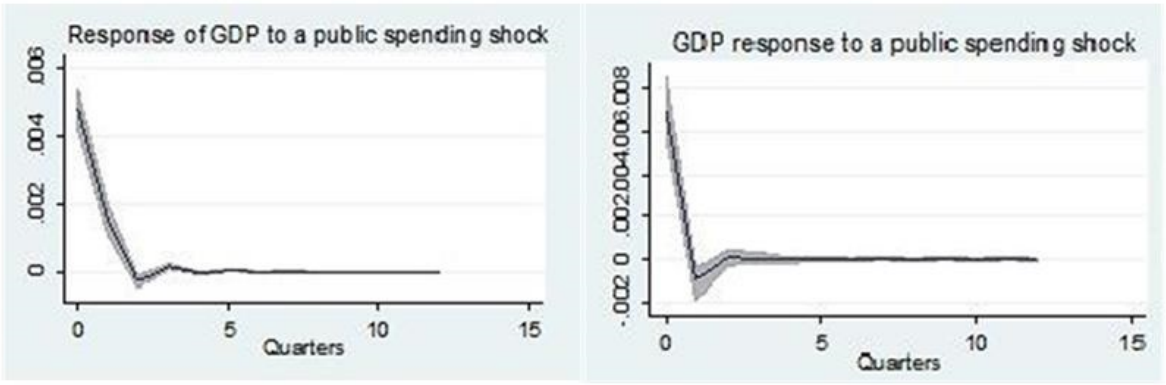

Figure 1: GDP responses to a one standard deviation shock in public spending in AEs (left) and EMEs (right) - PVAR model

$$X_{n,t} = \sum_{j=1}^{p} D_j X_{n,t-j} + C_n + CZ_{n,t} + \sum_{j=1}^{p} B_j Z_{n,t} X_{n,t-j} + \varepsilon_{n,t} \tag{3}$$

with

- $X_{n,t} \equiv [G_{n,t}, Y_{n,t}]$, where G is the growth rate of quarterly government spending (consumption) and Y the quarterly growth rate of GDP, both in real terms;
- D a a matrix polynomial with L lags;
- C_n a vector of country-specific intercepts;
- $Z_{(n,t)}$ a matrix of interaction terms that can influence both the dynamic relationship and the level of the variables;
- $\varepsilon_{n,t}$ is a vector of errors terms that can be interpreted as i.i.d. shocks to public spending and GDP growth under its structural form.

Figure 2 presents the response of real GDP growth rate following a one unit shock in public spending respectively in AEs and EMEs, and cumulative IRFs for both groups are presented in appendix E.

Spending multipliers in impact are computed from these IRFs. Once again, we find a smaller multiplier in EMEs than in AEs: 0.39 in EMEs, 1.44 in AEs. These results are very close to the ones found with the baseline PVAR model, and the effects also disappear that the effect disappears after the first period.

Concerning AEs, estimated fiscal multipliers range from 0.4 to 2.1 IMF (2012), our results are therefore in line with existing literature.

Concerning EMEs, only few articles are interested in a panel of EMEs, and our results are in accordance with most of them. Indeed, Ilzetzki et al. (2013) find that spending multipliers in

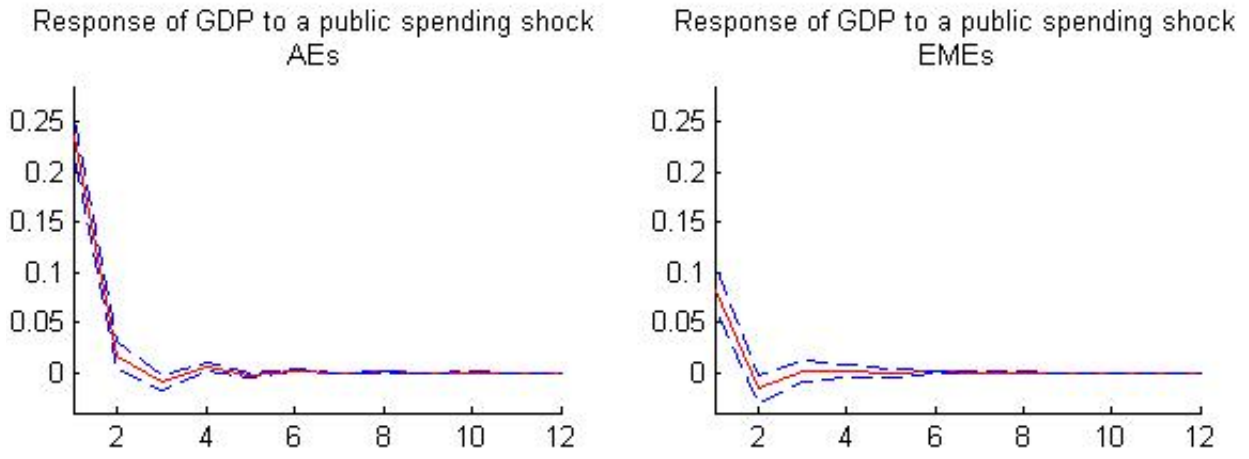

Figure 2: GDP responses to a one unit shock in public spending in AEs and EMEs – IP-VAR model

EMEs are insignificant, but they show that spending multipliers are smaller in EMEs than in AEs. Moreover, Kraay (2012) finds spending multipliers around 0.4. Estevão and Samake (2013) estimate spending multipliers following a spending cut and find spending multipliers from 0.01 to 0.5.

Showing that fiscal multipliers are smaller in EMEs than in AEs leads to wonder about the reasons of such a difference.

In our opinion, the difference of fiscal multipliers in EMEs and AEs is due to a very different context between the two types of countries. Indeed, EMEs have a poorer institutional context that reduces economic performances (North, 1990) and increases the decision and implementation lags of fiscal policy (Hemming et al., 2002). In addition to the institutional issue, the economic context is also very different. Actually, the supply-side is less flexible in EMEs than in AEs and instability and uncertainty are larger there.

It is difficult to empirically test for the influence of these contextual factors on the spread between multipliers in EMEs and in AEs. However, we argue that the particular institutional and economic contexts in EMEs make the impact of the key determinants of fiscal multipliers different from those in AEs. To the best of our knowledge, none of the studies interested in EMEs provide an empirical analysis about this point.

Actually, Kraay (2012) and Estevão and Samake (2013) implement new methods to compute fiscal multipliers in EMEs and Less Developed Countries (LDC) using annual data. However, they are not interested in the difference between EMEs and AEs.

Concerning Batini et al. (2014), they present the main determinants of fiscal multipliers. The degree of development is considered as a determinant: EMEs would have smaller multipliers than AEs, but no empirical explanation is provided. Moreover, they consider that other determinants of fiscal

multipliers are the same in EMEs and AEs[5], and their impact is supposed to be the same.
As in Batini et al. (2014), Ilzetzki et al. (2013) analyse the determinants of fiscal multipliers, but it cannot account for explain the difference between multipliers in EMEs and AEs. They use a PVAR model to estimate spending multipliers according to several criterion, but they estimate a global effect by mixing EMEs and AEs. Thus, all countries in a same sub-sample have the same fiscal multiplier, whatever the development degree. So macroeconomic factors are supposed to have an homogenous effect.
Another point has to be addressed. Ilzetzki et al. (2013) do not seem to envisage a strong correlation between the degree of development and the other level of macroeconomic variables. The difference of multipliers can be fully attributed to the criterion that separates the sample only if there is no other difference between the two groups. For example, Ilzetzki et al. (2013) show that EMEs have smaller multipliers than AEs. Then they mix both EMEs and AEs, and they separate the sample according to the level of public debt; they show that a high public debt-to-GDP ratio causes a smaller multiplier. However, maybe most of the countries with high debt are also the less developed, so the effect of public debt cannot be isolated from the effect of development and vice versa.

Thus, several studies show the key determinants of fiscal multipliers (see table 2 in appendix), but they do not account for the differences between EMEs and AEs. In the remainder of the article, the impact of several macroeconomic factors on spending multipliers is investigated by allowing for the heterogeneity of the impact according to the level of development.

4 On the potential sources of differences between EMEs and AEs

In this section, the expected effects of each determinant are presented, and we explain why these determinants could act in a different way and extent in EMEs and AEs.

Table 2 in appendix presents the main articles about fiscal multipliers and their determinants. From this literature, we retain five key determinants: the degree of trade openness, the state of public finances, the savings rate, the capacities utilisation rate and the financial development.[6]

4.1 Trade openness

Trade openness should have a negative impact on the fiscal multiplier: the higher the propensity to import, the higher the leakage of demand is when public spending increases.

The efficiency of a fiscal stimulus could be more deteriorated by imports in EMEs than in AEs because of two main characteristics.

[5]They consider that each determinant acts in the same way and extent except for public debt: they envisage a lower threshold at which public debt becomes bad for public spending efficiency in EMEs than in AEs.

[6]We do not address neither the question of the exchange rate regime or the role of monetary policy rate. We are aware of the importance of these factors but the methodology used does not allow testing for them. Testing the impact of exchange rate regime applies for using a discontinuous classification, and the monetary policy rate is not a structural factor, so we cannot integrate it as a conditioning variable (see section 5). However, we tested these factors using IP-VAR model, and results are consistent with existing literature.

First, in EMEs with large openness to trade, government could be encouraged to strongly rely on trade taxes as main source of revenue. However, trades are too volatile to constitute a healthy basis for public revenue and then for fiscal policy. Thus, a country that relies on volatile revenue to implement its fiscal policy is more likely to be inefficient because unpredictable (sizable) changes in public resources are more likely to occur.

Second, AEs in our sample are mainly members of the European Union. Therefore, a coordination of the fiscal policies between several countries is more likely to be implemented than in the EMEs considered. The leakage of demand by imports would be smaller in these AEs because imports of the main commercial partners would also increase – and exports too.

As multiplier effects depend on the propensity to import, we use the imports-to-GDP ratio to measure this impact.

4.2 The state of public finances

Concerning public debt, Keynesian mechanisms suppose that consumption is related to current income, so whatever the debt level, multiplier effects could not be affected. However, when consumers are forward-looking, they anticipate that an increase in public spending by increasing public debt today is equivalent to an increase in tax levels later. Thus, they will increase their savings to protect themselves against the rise of tax levels: consumption will not increase after a fiscal stimulus (Barro, 1974). To hold, this Ricardian equivalence requests agents to be altruistic. In this way, a high public debt reduces spending multiplier when agents are altruistic.

However, Sutherland (1997) shows that at high levels of public debt, fiscal stimulus can have anti-Keynesian effects even if consumers are not altruistic. Indeed, when public debt is high, agents anticipate they will have to pay more taxes soon: the debt burden will not be only supported by next generations. Thus, consumers increase their savings without being altruistic, and without the need to have some possibilities to transfer wealth across generations.

This argument seems to be true in AEs as in EMES, but we argue that it could be more important in EMEs because the institutional context reduces both the quality of spending and revenue management, and the confidence in government. Implications could be twofold: the threshold from which public debt produces anti-Keynesian effects might be lower in EMEs than in AEs (Batini et al., 2014), and the effects of a high public debt could be worse in EMEs than in AEs.

Moreover, a fiscal expansion with fiscal sustainability concerns can reduce the availability of external credit for the private sector. This issue can be more important in EMEs because of weaker internal possibilities of financing. Thus, if external credit decreases further to a fiscal expansion, public consumption crowds out private demand.

In order to measure the impact of the state of public finances, the debt-to-GDP ratio is used.

4.3 Uncertainty and the savings rate

Another factor that plays a key role in fiscal policy efficiency is uncertainty. Uncertainty can affect fiscal multipliers through most of the factors previously developed, but it can especially

modify fiscal policy efficiency by the channel of savings. Actually, in an uncertain environment, agents increase their demand for precautionary savings (Leland, 1968). Thus, if the fiscal stimulus occurs when uncertainty is rising, consumers increase their savings[7]. This leakage of demand leads fiscal policy to be inefficient. Hence, we use the savings-to-GDP ratio to measure uncertainty.

Using the savings rate, expectations about both inflation and potential changes in tax levels are also taken into account. If confidence in government is low, fiscal expansion is likely to imply an increase in savings. A low confidence level can reflect poor governance, and in this way fiscal policy would be less efficient. Thus, we argue that in EMEs the effect of savings could be more unfavourable than in AEs because a high savings rate involves uncertainty.

Moreover, uncertainty and pessimistic anticipations are more important when governance is poor. So, if a high savings rate implies uncertainty and pessimistic anticipations, savings rate could reflect poor governance. This is more likely to be true in EMEs, so we argue that the unfavourable effect of savings can be more important in EMEs than in AEs.

However, in EMEs, the savings-to-GDP ratio may not reflect real savings. Indeed, a weak financial development could lead agents to keep precautionary savings out of the official banking system. Small savings rate is therefore not representative of low uncertainty, and spending multipliers in EMEs with low savings-to-GDP ratios could not be very high. Thus, the gap between multipliers in EMEs with low savings rates and EMEs with high savings rates could be smaller than the one in AEs.

4.4 The capacities utilisation rate

Keynesian mechanisms are based on several hypotheses. One of them concerns the production capacities utilisation rate: Keynesian mechanisms are effective in economies with excess production capacities. Indeed, when public spending increases, global demand rises and supply-side responds by increasing production. However, if production capacities are fully used, supply cannot quickly increase, and this reduces the spending multiplier. This argument explains why fiscal multipliers are larger in bad times (when production capacities are partially used) than in good times (when production capacities are fully used) (Baum and Koester, 2011; Baum et al., 2012).

To measure the capacities utilisation rate, we use the unemployment rate, which measures the quantity of unemployed workers related to the quantity of workers. In countries with many available workers, the adaptability of the supply-side is larger – enterprises can quickly engage new workers. Thus, the unemployment rate is expected to have a positive impact on spending multiplier, because a high unemployment rate reflects a recessionary context.

Unemployment could have a different impact in EMEs and AEs. Actually, supply-side is often considered as less flexible in EMEs than in AEs, even if unemployment could be higher in EMEs. A possible explanation involves the informal sector. Many agents considered as unemployed work in informal sector, so they could not want to be engaged by formal enterprises. Thus, the adaptability of the supply-side would be limited. In this way, the effect of unemployment would be smaller in

[7]Note that this statement is true if the income is upper than its subsistence level.

EMEs than in AEs.

4.5 Financial development

Credit-to-GDP ratio is often used as an indicator of financial development. On one hand, financial development would have some negative impacts on multiplier effects.

First, weak credit-to-GDP ratio can mean that economic agents are credit-constrained. According to previous results in the literature, a smaller ratio implies that Ricardian equivalency proposition is not valid (Khalid, 1996). An interpretation is that people are less forward-looking because they cannot smooth their consumption over the time. Thus, countries with smaller credit-to-GDP ratio might have larger fiscal multipliers.

Second, savings possibilities are few when financial development is weak. Thus, agents have only few possibilities to smooth their consumption. If they cannot shift their consumption, public consumption is less likely to crowd-out private consumption even if interest rates are increased.

Finally, financial development could imply more instability in EMEs than in AEs (Aghion et al., 2004). In this way, a larger financial development would reduce spending multiplier by creating instability, and this effect would be more important in EMEs than in AEs.

On the other hand, we argue that financial development can have a positive impact on spending multipliers. To increase their consumption (investments), consumers (investors) need some financing sources. A more developed financial sector increases the availability of financing sources, and also the kind of financing. The credit rationing could be less important, and agents can easily increase their consumption (investments). In EMEs, investment is less sensible to interest rates because it is constrained by rationing from banking. Thus, the positive effect of financial development could be more important in EMEs than in AEs by increasing the available financings.

Therefore, we argue that the particular context of EMEs makes them more sensible to the degree trade openness, the level of public debt, the degree of uncertainty, the financial development; this makes them less sensible to the unemployment rate.

5 On the impact of key determinants on spending multipliers in EMEs and AEs

5.1 Methodological issue

We advocate that from a theoretical point of view, the key determinants of multipliers in EMEs and AEs can act in a different way. This statement has to be empirically tested with an appropriate methogology.

In section 3, we use PVAR and IP-VAR specifications to compute spending multipliers in EMEs and AEs. However, using these both methodologies can be problematical for many reasons.

Running the PVAR model, the dynamic between endogenous variables is supposed to be homogenous across cross-sectional units. when we are interested in countries, this assumption is not realistic, especially when there are EMEs and AEs in the same sample. Moreover, estimating a PVAR model necessitates dividing the sample into sub-samples according to one criterion.
Thus, testing the impact of several characteristics implies that the number of sub-samples quickly increases[8], and the number of observations by sub-sample quickly decreases. The last limit of PVAR specification is the potential correlation between the criterion at the origin of the sub-samples, and another one. Indeed, if such a correlation exists, the results that are attributed to the criterion can be due to the other one.

With the IP-VAR specification, we can control for two characteristics at the same time. However, the two interaction variables have to be fixed at arbitrary levels, so the threshold from which the dynamic can change is exogenous.

In order to address these problems, we use a Panel Conditionally Homogenous VAR model (PCH-VAR) developed by Georgiadis (2012). Contrary to the two previous models, the PCH-VAR allows for the dynamic between endogenous variables to vary across the cross-sectional units according to another variable (named the conditioning variable, or the interaction variable). Moreover, it does not need to arbitrary fix the level of the interaction variable: the dynamic relationship between the endogenous variables can be different at many levels (up to 300) of the conditioning variable. Thus we can observe the smooth evolution of the dynamic relationship between GDP and public spending according to the level of another variable – the degree of development. Note that two conditioning variables can be used.

Considering all the previous motivations, we use the PCH-VAR model. The reduced form of the model is:

$$X_{i,t} = \sum_{j=1}^{p} E_j\left(z_{it}\right) X_{i,t-j} + \delta_i + H_q w_{t-q} + e_{i,t} \tag{4}$$

where

- $X_{(i,t)} \equiv \left[G_{(i,t)}; Y_{(i,t)}\right]$ the vector of endogenous variables as previously defined;
- $z_{(i,t)}$ is the matrix of conditioning variables (here development and an other one);
- δ_i is the vector of deterministic terms (fixed effects and country specific time trends);
- w_t is the vector of exogenous variables that are supposed to have an homogenous effect across countries;
- E and H are matrices of parameters.

[8]Estimating the impact of N characteristics needs to have 2^N sub-samples.

As in the simple PVAR case, PCH-VAR estimation gives us IRFs, but here, these functions are conditional to two variables. Indeed, we have six graphs in three dimensions. In other words, if we consider A and B, two conditioning variables, we have six graphs:

- Three graphs for a given level of A (10, 50, 90 % percentile of the sample), in which the IRF can vary according to the B variable;
- Three graphs for a given level of B (10, 50, 90 % percentile of the sample), in which the IRF can vary according to the A variable.

Typically, we investigate whether the impact of public spending on GDP is conditional to a set of macroeconomic characteristics. Therefore we are interested in the figures that present the IRF according to some variables at low and high levels of development. By means of these IRFs, we know the reaction of GDP growth rate following a one unit shock in public spending growth rate. Actually, as with the PVAR model, these coefficients do not give us fiscal multipliers. However, by using PCH-VAR model we only obtain an approximation of spending multipliers, and this is the main limit of this model. Nevertheless, pointing out the differences in the reaction of GDP growth to public spending variations according to the level of development is necessary to confirm that we have to take into account this kind of (structural) characteristics in fiscal multipliers estimations.

5.2 Results

Before estimating the impact of the factors considered, the PCH-VAR model is used in order to confirm previous results about the impact of the degree of development.

5.2.1 The degree of development

The following figures respectively show the response of GDP to a one unit shock in public spending, after one quarter, according to the level of constant GNI (figure 3), GNI per capita (figure 4) and HDI (figure 5).
In each case, we calculate an approximation of fiscal multiplier by collecting IRFs coefficients and calculating the average of the spending-to-GDP ratio; then, the ratio of the first to the second is used. First, values are computed belonging the first and the last quartiles of the distribution of the conditioning variable. Second, multipliers are computed for the 10% percentile (90% percentile) of lower (higher) values of the conditionning variable; mulipliers values for the quartiles are presented in table 1 and the ones for the percentiles are presented in appendix, table 10.

Thus, the three indicators of development give a close to zero spending multiplier for the less developed countries in the sample (-0.04), and a close to one spending multiplier (1.01) in the more developed ones[9]. These values computed for EMEs are lower than those estimated using PVAR and IP-VAR, probably because of the countries that are in the first quartile of the GNI distribution: their development level is less than the average level of all the EMEs considered in PVAR and

[9]Note that HDI gives a smaller multiplier for the more developed countries.

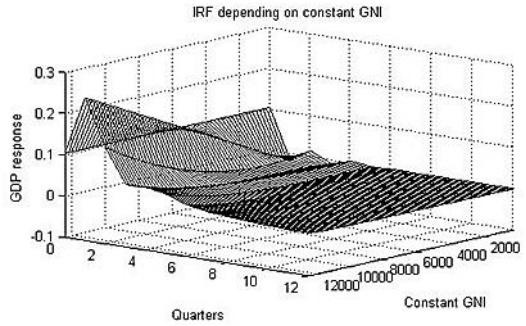

Figure 3: GDP response to a one unit shock in public spending according to the level of constant GNI

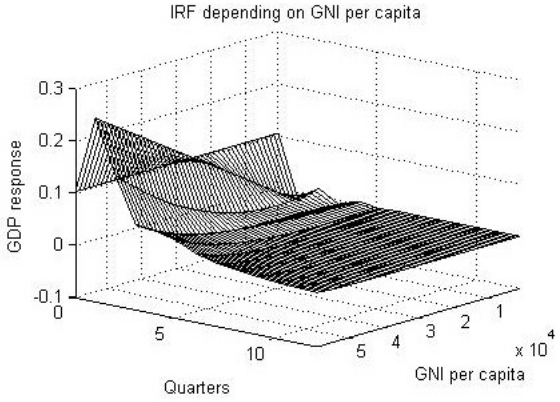

Figure 4: GDP response to a one unit shock in public spending according to the level of GNI per capita

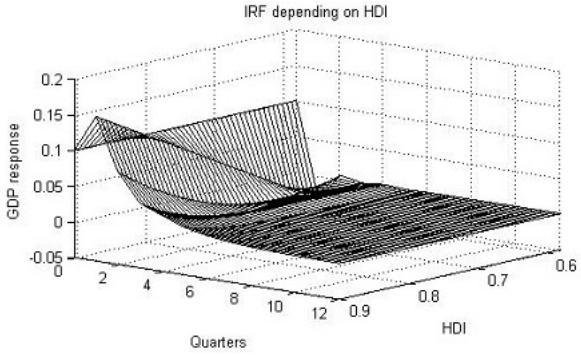

Figure 5: GDP response to a one unit shock in public spending according to the Human Development Index

Table 1: Spending multiplier at time t=1 according to the degree of development

	Spending multiplier (average)
Value of constant GNI	
First quartile	-0.04
Last quartile	1.01
Value of GNI per capita	
First quartile	-0.04
Last quartile	1.01
Value of HDI	
First quartile	0.04
Last quartile	0.78

IP-VAR models.

In all the following cases, IRFs coefficients at low and high levels of the conditioning variables[10] are collected for two levels of development: at low level (fixed at 10% percentile of the development variable) and at high level (fixed at 90% percentile of the development variable). Thus each group of countries, respectively considered as EMEs and AEs, has two multipliers and the gap between these two values is interpreted as the impact of the conditioning variable. Note that the relative rate of change is used to measure the gap between the two multipliers, thus we measure the sensitivity of multiplier to a change in the conditioning variable.

Figures are presented by group of countries (EMEs and AEs), conditionnal IRFs for all countries combinated are presented in appendix, figure 14.

5.2.2 Trade openness

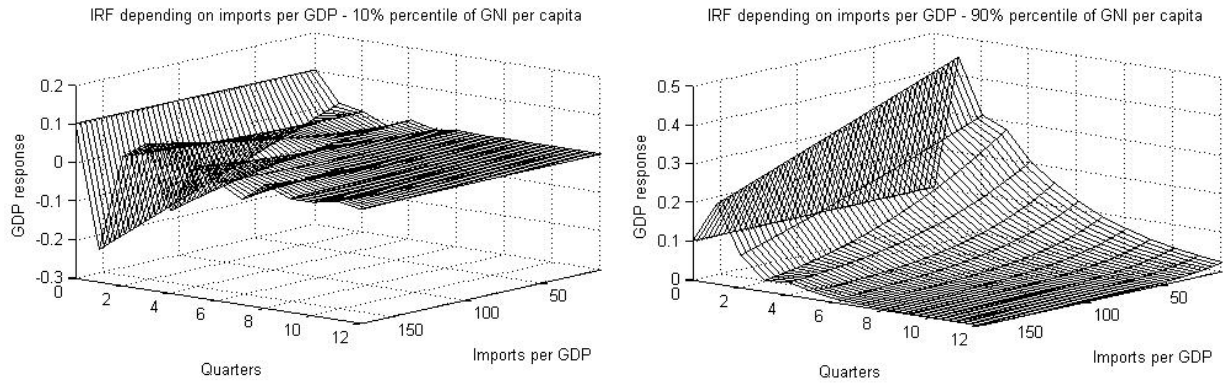

Figure 6: GDP response to a one unit shock in public spending according to import-to-GDP ratio at low and high levels of development – PCH-VAR model

[10]The choosen levels are presented in table 12 in appendix.

Trade openness may have a negative impact on fiscal multiplier: the higher the propensity to import is, the higher the leakage of demand is when public spending increase. Considering both EMEs and AEs together we cannot confirm this argument. Actually, as EMEs have a negative fiscal multiplier while AEs have a positive one, the overall effect could be insignificant. Studying separately EMEs and AEs (figure 6) permits to confirm the negative impact of imports on the GDP response to a fiscal expansion[11], but the effect is more important in EMEs than in AEs, and the spending multiplier becomes negative[12] in EMEs when openness is high. Indeed, in EMEs, the decrease of GDP created by an increase in public spending is around 90% larger when the imports-to-GDP ratio exceeds 100% of GDP. In AEs, the rise of GDP induced by an increase in public spending is 60% smaller when the ratio exceeds 100% of GDP. This conclusion confirms our expectations (section 4).

5.2.3 The state of public finances

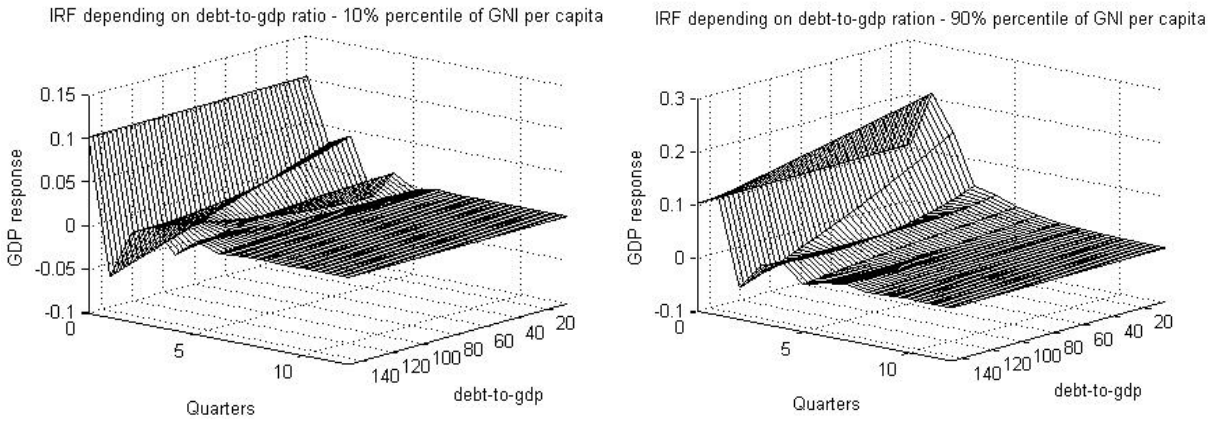

Figure 7: GDP response to a one unit shock in public spending according to debt-to-GDP ratio for low and high levels of development – PCH-VAR model

Globally, our results are in accordance with our expectations: multiplier effects are smaller, and even negative in EMEs, when public debt is high. A negative fiscal multiplier is possible especially if the confidence of consumers and investors is diminished, which is more likely to occur when the public debt-to-GDP ratio is increased by the fiscal expansion (Spilimbergo et al., 2009). In EMEs, multiplier is around 0.06 when public debt is lower than 40% of GDP, but when public debt becomes higher than 100% of GDP, spending multiplier becomes negative, around -0.12. This means that in the less developed countries in our sample, an increase in public spending is around 150% higher when public debt represents less than 40% of GDP.

[11] We also estimate the model taking into account exports and we obtain the same results.

[12] Tervala (2009) presents a micro-based macro model in which fiscal multipliers can be negative under certain assumptions as a high substitution rate between private and public consumption and a strong complementarity between public consumption and leisure.

Note that the negative impact of fiscal stimulus in case of high debt can reflect more than anti-Keynesian effects. Actually, anti-Keynesian effects lead to no effects of expansionary policy, but not necessarily to a negative one. Another explanation is the negative influence of high debt on interest rate premia (Hemming et al., 2002): when public debt is high, risk premia is important and interest rates increase. The link between risk premia and interest rates is stronger when government credibility is weak (Alesina and Perotti, 1994). As in EMEs governance is often considered as poor, credibility of government in the management of public debt might be smaller, leading to a negative spending multiplier.

In AEs, spending multiplier is around 1.15 when public debt is lower than 40% of GDP, and it decreases up to 0.8 when public debt exceed 100% of GDP. In AEs, an increase by one unit of public spending leads to an increase of GDP by 43% higher when public debt is smaller than 40% of GDP.

Thus, the effect of high public debt is worse in EMEs than in AEs.

5.2.4 Uncertainty and the savings rate

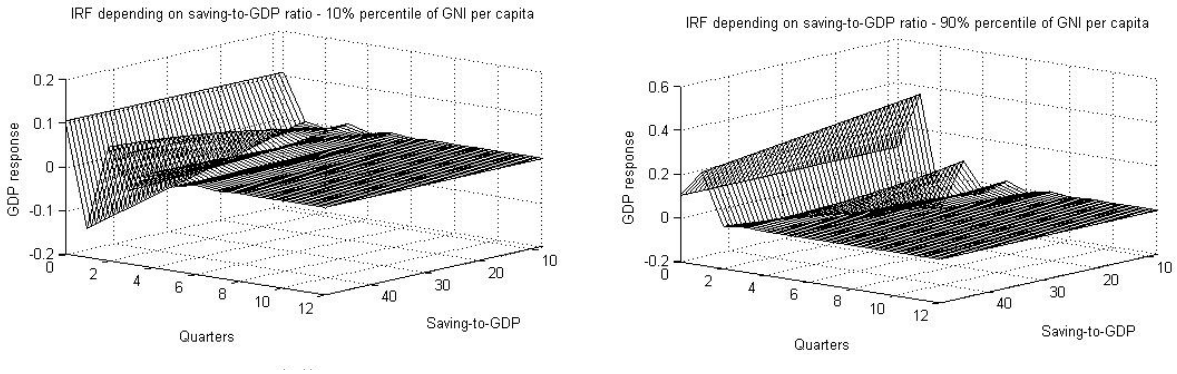

Figure 8: GDP response to a one unit shock in public spending according to savings-to-GDP ratio at low and high levels of development – PCH-VAR model

As explained in section 4, we expect that savings reduce spending multiplier, firstly because savings are a leakage of demand, secondly because savings can be related to uncertainty. Figure 8 confirm this assumption, both in EMEs and AEs. However, the scale of the effect is different between AEs and EMEs. In EMEs, the reduction of GDP after an increase in public spending is around 80% larger when the savings rate is high; in AEs, the rise of GDP due to a fiscal stimulus is 33% smaller when savings exceed 30% of GDP. Thus, EMEs are more sensitive to the savings rate than AEs.

5.2.5 The capacities utilisation rate

Figure 9 shows that the higher the unemployment rate is, the higher spending multipliers are in AEs as in EMEs. However, we find a larger sensitivity of spending multipliers in EMEs than in

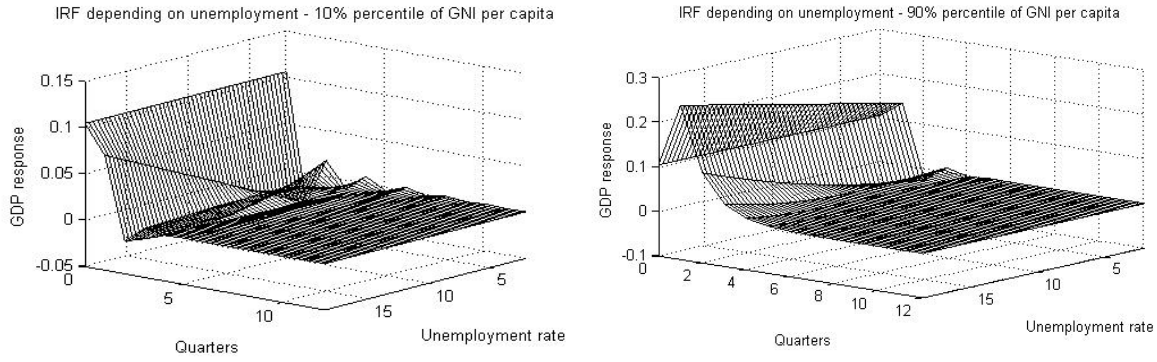

Figure 9: GDP response to a one unit shock in public spending according to unemployment rate at low and high levels of development – PCH-VAR model

AEs. We have no strong explanation about that.

5.2.6 Financial development

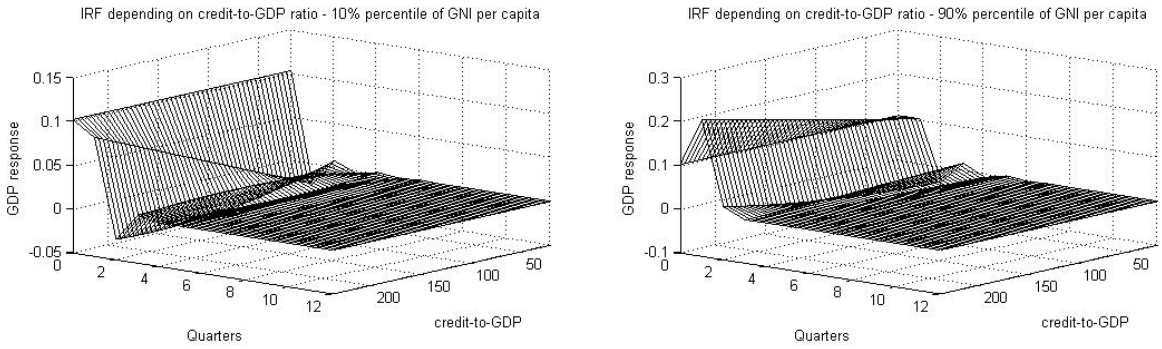

Figure 10: GDP response to a one unit shock in public spending according to credit-to-GDP ratio at low and high levels of development – PCH-VAR model

Figure 10 shows that a higher development of financial system increases public spending efficiency. As explained in section 4, the impact of financial development can be negative (by enabling the Ricardian equivalency, by increasing savings possibilities and by increasing instability) or positive (by increasing financing possibilities). Results from the PCH-VAR estimations are consistent with the positive effects of a reduction in credit rationing. As expected, this impact is weaker in AEs than in EMEs.

Thus, using a PCH-VAR model, we show that public spending efficiency is more sensitive to the macroeconomic factors considered in EMEs than in AEs. This statement can explain the inferiority of spending multipliers in EMEs because each factor has a worse effect on the multiplier in EMEs

than the one in AEs. However, according to the average characteristics of our sample (see table **??**), this analyse shows that an improvement of the considered factors is not sufficient to make public spending in EMEs as efficient as in AEs despite a larger sensitivity.

6 Concluding remarks

Globally, our results are in accordance with previous results in the literature: we find a very small multiplier for EMEs (around zero) and close to one for AEs.

We show that imports, public debt and saving reduce spending multipliers both in EMEs and AEs, while unemployment and financial development increase spending multipliers. The size of the impact of each determinant is relatively more important in EMEs than in AEs but the weakness of fiscal multipliers in EMEs remains whatever the factor considered. Thus, in spite of a larger sensitivity to the determinants considered, in EMEs governments have to act on other factors to improve the efficiency of fiscal policy.

Moreover, results about fiscal multipliers in AEs cannot be fully extended to the case of EMEs. For example, even if a high public debt-to-GDP ratio decreases spending multipliers both in AEs and EMEs, in EMEs the efficiency of fiscal policy stays nearly insignificant at low levels of public debt. Thus, suggesting a decrease in public debt in EMEs to improve their fiscal policy efficiency would be insufficient. Besides, even if some factors decrease multipliers in AEs, public spending still have a positive effect on GDP, whatever the determinant we consider. Concerning EMEs, when trade openness is high, as in the case of high public debt or saving rate, spending multipliers become negative. This can be interpreted as a total crowding out of private demand.

Nevertheless, our analysis presents two main limits because of the methodologies used. First, analysing the effect of several determinants at the same time would be interesting and even better than analysing them separately. However, the methodology used does not allow adding more than 2 conditioning variables mainly because some interaction spaces are likely to be sparsely populated. Second, we have not enough data to control for public revenue. The computed multipliers are spending multipliers, considering no change in revenue structure and level. This point could however be relatively positive as it implies that fewer assumptions are imposed on the estimated relationship.

In spite of these limitations, this paper empirically shows that it is necessary to consider the development level when fiscal multipliers are analysed in a panel of EMEs and AEs, and it opens perspectives for future researches.

On one hand, we argue that institutions – notably revenue and spending management – could be responsible for the differences between fiscal policy efficiency in AEs and EMEs. Such an effect is not tested in the model because of the lack of variability in institutional measurements. However, the institutional context is likely to be responsible of the gap inexplicable only by the traditional determinants.

On the other hand, it could be interesting to analyse the private consumption behaviours after a fiscal stimulus according to the level of development. Maybe analysing consumer's behaviours can permit to support our conclusion and to better explain the weakness of fiscal multiplier in EMEs.

Finally, this paper shows that recommendations made in order to improve fiscal policy efficiency in EMEs differ from those for AEs. To be more efficient, EMEs have to act on others factors than the traditional determinants of fiscal multipliers, otherwise the effect of public spending is likely to remain weak.

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Appendix

Figure 11: Eigenvalues of the companion matrix for AEs (left) and EMEs (right)

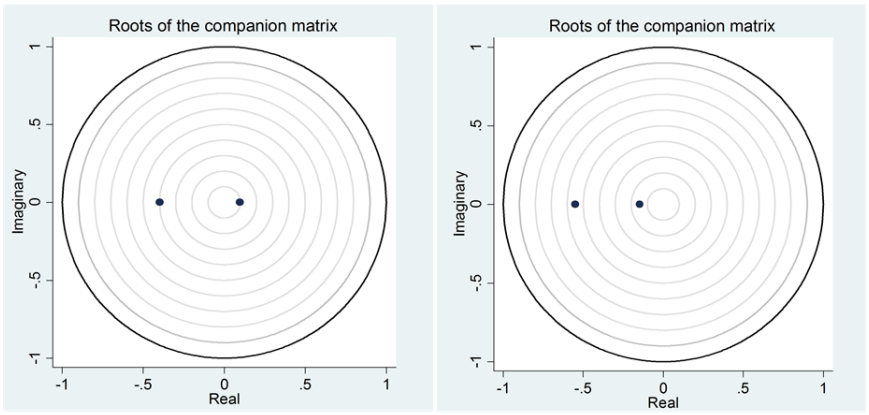

Figure 12: Cumulative IRFs depending on development - PVAR model

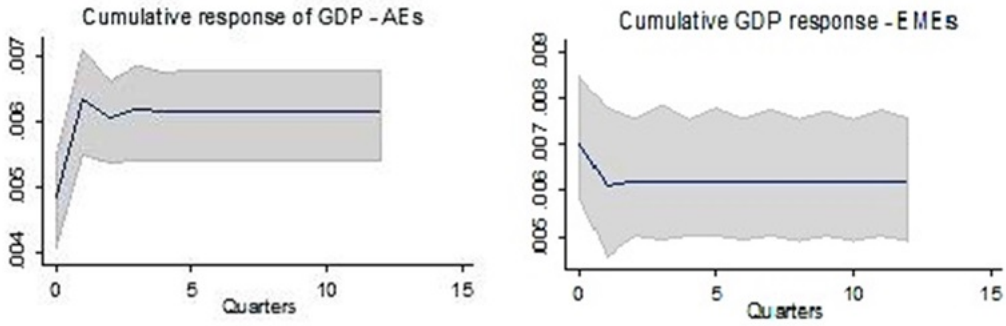

Figure 13: Cumulative IRFs depending on development - IP-VAR model

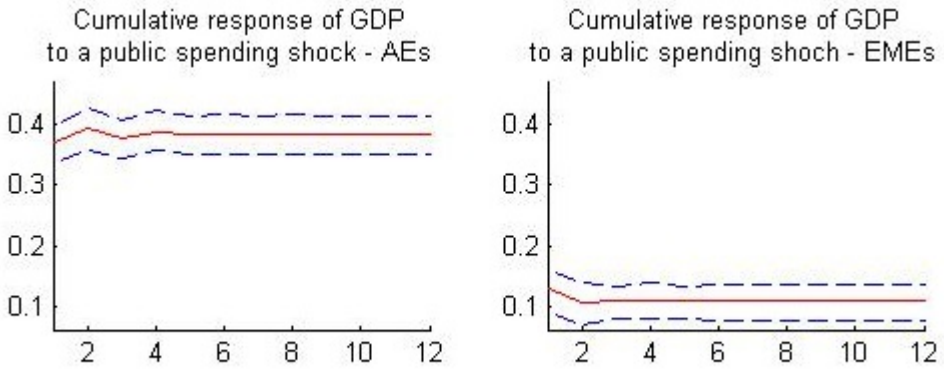

Table 2: Fiscal multipliers determinants in the literature

Factors	Authors	Country	Methodology	Results
Trade openness	Ilzetzki et al. 2013	AEs & EMEs	Panel VAR	Trade openness increases Fiscal Multipliers (FM)
Exchange rate regime	Born et al. 2013	OECD	Panel VAR	FM are larger in fixed exchange rate regimes
	Ilzetzki et al. 2013	AEs & EMEs	Panel VAR	
	Corsetti et al. 2011		New Keynesian Model	
	Corsetti et al. 2012	OECD	Two-stages estimation	
Debt Level	Ilzetzki et al. 2013	AEs & EMEs	PVAR	A higher government debt-to-GDP ratio decreases FM
	Cimadomo et al. 2010	Euro Area	Time-varying Structural VAR	
	Deák and Lenarcic 2012	USA	Regime-switching VAR	
Labor market rigidity	Cole and Ohanian 2004	USA	DSGE	Rigidities increase FM (if imply wage rigidities)
	Gorodnichenko et al. 2012	Finland	DSGE	
Quality of public expenditure and revenue management	Cimadomo et al. 2010	Euro Area	Time-varying SVAR	A smaller share of government investment reduces FM A larger share of public wages decreases FM
State of the business cycle	Mittnik and Semmler 2012	USA	Regime-dependant VAR	FM are larger in time of low economic activity (or downturns)
	Baum et al. 2012	G7	Threshold VAR	
	Auerbach and Gorodnichenko 2012b	OECD	Regime-switching SVAR	
	Auerbach and Gorodnichenko 2012a	USA	Regime-switching SVAR	
	Auerbach and Gorodnichenko 2013	Japan	Regime-switching SVAR	
	Baum and Koester 2011	Germany	Threshold SVAR	
	Corsetti et al. 2012	OECD	Two-stages estimation	
	Perotti 1999	OECD	Theoretical	
Degree of monetary accommodation to fiscal shocks	Nakamura and Steinsson 2014	USA	Narrative approach	FM could be higher when the interest rate is lower
	Woodford 2011		New Keynesian Model	
Composition and implementation of fiscal policy	Barro and Redlick 2011	USA	Narrative approach	Increasing tax has a negative impact on GDP
	Alesina and Ardagna 2010	OECD	Stat. analysis & simple regression (FM is not estimated)	Fiscal stimuli based on tax reductions have more positive effects (than spending increases)
	Mountford and Uhlig 2009	USA	VAR	
Financial development	Corsetti et al. 2012	OECD	Two-stages estimation	The higher the credit to GDP ratio is, the higher FM are
	Cimadomo et al. 2010	Euro Area	Time-varying SVAR	
Development	Ilzetzki et al. 2013 Kraay 2012 Estevão and Samake 2013	AEs & EMEs	PVAR	Fiscal multipliers are smaller in EMEs

Table 3: List of countries

Country	Code	Country	Code
Argentina	ARG	Iceland	ISL
Austria	AUT	Italy	ITA
Belgium	BEL	Japan	JPN
Bulgaria	BGR	Korea	KOR
Bolivia	BOL	Lithuania	LTU
Brazil	BRA	Luxembourg	LUX
Switzeland	CHE	Latvia	LVA
Costa Rica	CRI	Malta	MLT
Cyprus	CYP	Malaysia	MYS
Czech Republic	CZE	Nicaragua	NIC
Germany	DEU	Netherland	NLD
Denmark	DNK	Norway	NOR
Dominican Republic	DOM	Peru	PER
Spain	ESP	Philippines	PHL
Estonia	EST	Poland	POL
Finland	FIN	Portugal	PRT
France	FRA	Romania	ROM
United Kingdom	GBR	Singapore	SGP
Greece	GRC	Slovakia	SVK
Hong Kong	HKG	Slovenia	SVN
Croatia	HRV	Sweden	SWE
Hungary	HUN	Thailand	THA
Indonesia	IDN	Turkey	TUR
Irland	IRL	Uruguay	URY

Table 4: Data sources

Variable	Measurement	Source
d.ps	Final consumption of government at constant prices - US dollars - Log-difference	Eurostat - CEPALstat - Asian Bank of Development, financial and economic database
d.gdp	GDP at constant prices - US dollars - Log-diffrence	Eurostat - CEPALstat - Asian Bank of Development, financial and economic database
Public spending-to-GDP	Final consumption of government per GDP	Eurostat - CEPALstat - Asian Bank of Development, financial and economic database
Import-to-GDP	Imports of goods and services (% GDP)	World Bank - World Development Indicators Database
Debt-to-GDP	Gross government debt-to-GDP ratio	Abbas and others (2010) - IMF - A Historical Public Debt Database
Savings-to-GDP	National Gross savings (% GDP)	World Bank – World Development Indicators Database
Unemployment rate	Total unemployment (% of total labor force)	International Labor Organisation
Credit-to-GDP	Domestic credit to private sector (% GDP) provided by commercial banks and financial institutions	World Bank - World Development Indicators Database

Table 5: Descriptive statistics

Variable	**Observations**	**Mean**	**Std. Dev.**	**Min**	**Max**
d.ps	3448	0.01	0.06	-2.19	2.17
d.gdp	3448	0.01	0.02	-0.24	0.36
Public spending-to-GDP	3496	0.18	0.08	0.01	0.77
Import-to-GDP	3448	50.33	33.91	7.01	228.74
Debt-to-GDP	3448	54.89	29.72	3.69	186.44
Saving-to-GDP	4424	22.81	8.89	1.99	54.29
Unemployment rate	4224	7.76	4.27	0.70	25.20
Credit-to-GDP	3448	99.14	60.90	11.10	347.34

Table 6: Stationarity tests for real GDP growth rate (d.gdp) and real public spending growth rate (d.ps)

	No time trend		Time trend	
Series	Im-Pesaran-Shin	Fisher	Im-Pesaran-Shin	Fisher
d.gdp	-36.33 (0.00)	-49.67 (0.00)	-49.29 (0.00)	-48.14 (0.00)
d.ps	-46.33 (0.00)	-50.81 (0.00)	-47.40 (0.00)	-50.07 (0.00)

Table 7: Optimal lag length selection for AEs and EMEs

	AEs	EMEs
Lag	MMSC-AIC	MMSC-AIC
1	**1.91E-31**	**7.44E-32**
2	4.61E-31	9.66E-31
3	7.27E-31	4.43E-31
4	8.29E-31	1.43E-30
5	1.00E-30	1.53E-30
6	1.10E-30	8.42E-31

Table 8: Spending multipliers in AEs and EMEs using PVAR model

Countries	IRF coefficients	Initial Shock	ps/gdp	**Fiscal multiplier**
AEs	0.0048	0.0209	0.18	**1.28**
EMEs	0.0071	0.0799	0.22	**0.40**

Table 9: Spending multiplier in AEs and EMEs using IP-VAR model

Countries	IRF coefficients	Initial Shock	ps/gdp	**Fiscal multiplier**
AEs	0.26	1	0.18	**1.44**
EMEs	0.08	1	0.22	**0.39**

Table 10: Spending multipliers in AEs and EMEs according to development model using PCH-VAR model

Conditioning variable (CD)	Value of CD	IRF coefficient (average)	Public spending to GDP ratio (average)	**Spending multiplier**
Constant GNI	10% percentile	-0.02	0.32	**-0.05**
	First quartile	-0.01	0.24	**-0.04**
	Last quartile	0.18	0.18	**1.01**
	90% percentile	0.18	0.17	**1.11**
GNI per capita	10% percentile	-0.02	0.32	**-0.05**
	First quartile	-0.01	0.24	**-0.04**
	Last quartile	0.18	0.18	**1.01**
	90% percentile	0.22	0.17	**1.28**
DHI	10% percentile	0.005	0.32	**0.02**
	First quartile	0.01	0.24	**0.04**
	Last quartile	0.14	0.18	**0.8**
	90% percentile	0.15	0.17	**0.86**

Figure 14: GDP response to a one unit shock in public spending conditionally to the factors considered – PCH-VAR model, all countries

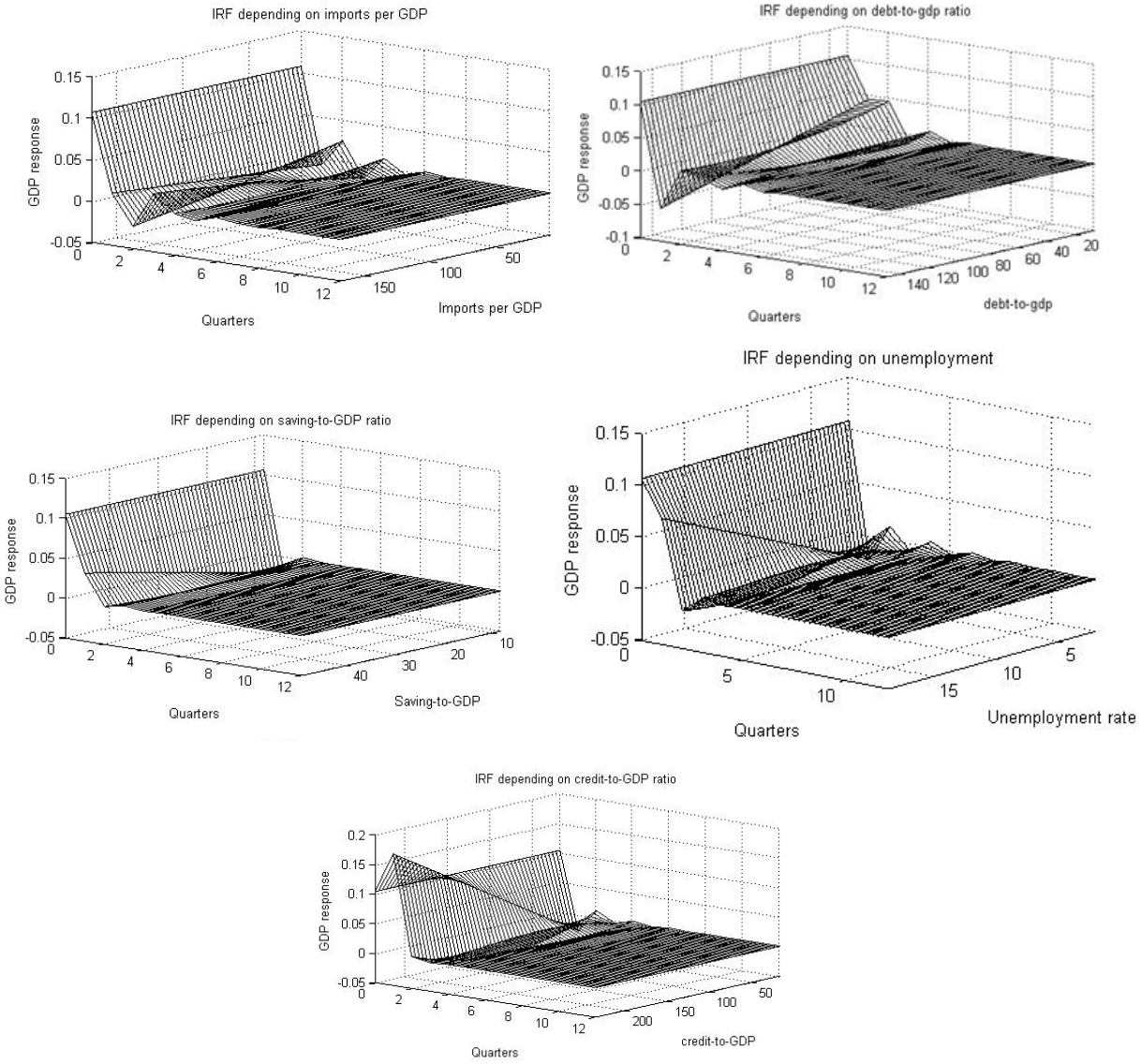

Table 11: Spending multipliers at low and high degree of development according to the traditional determinants

Conditioning Variables	At 10% percentile of GNI per capita	At 90% percentile of GNI per capita
Low import multiplier	-0.02	2.44
High import multiplier	-0.51	1.51
Relative difference	0.96	0.61
Low debt multiplier	0.06	1.15
High debt multiplier	-0.12	0.80
Relative difference	1.50	0.44
Low saving multiplier	-0.06	1.99
High saving multiplier	-0.33	1.50
Relative difference	0.82	0.33
Low unemployment multiplier	-0.06	0.89
High unemployment multiplier	0.19	1.36
Relative difference	1.31	0.34
Low credit multiplier	-0.05	0.65
High credit multiplier	0.20	1.11
Relative difference	1.25	0.41

Table 12: Thresholds for low and high levels of the conditioning variables

Variable	Low level	High level
Import-to-GDP	0%-50%	100%-150%
Public debt-to-GDP	0%-40%	100%-140%
Savings-to-GDP	0%-20%	30%-50%
Unemployment rate	2%-6%	14%-18%
Credit-to-GDP	0%-50%	150%-200%

Table 13: Means of main determinants in AEs and EMEs

Variable	**EMEs**	**AEs**	**T-test (p-value)**
Imports per GDP	43.31	55.23	10.32 (0.00)
Public debt to GDP	49.07	62.05	10.25 (0.00)
Savings to GDP ratio	20.11	25.87	22.06 (0.00)
Unemployment rate	8.48	7.09	10.7 (0.00)
Financial development (Credit to GDP ratio)	55.31	129.8	44.26 (0.00)